Spring 1-2016

Electrical and Computer Engineering Newsletter

Department of Electrical and Computer Engineering

UNIVERSITY of DAYTON

THE DEPARTMENT OF

ELECTRICAL AND COMPUTER ENGINEERING

SPRING 2016

CALENDAR OF EVENTS

Easter Break
March 23-28, 2016

•

ECE Industrial Advisory Committee Meeting
April 15, 2016

•

Stander Symposium
April 20, 2016

•

Last Day of Classes
April 29, 2016

Chair's Corner *Dr. Guru Subramanyam*

In the fall of 2015, we welcomed our newest faculty member, Dr. Vamsy Chodavarapu, to our department and UD. Professor Chodavarapu is an internationally recognized expert in sensors and devices. He joins us as a tenured associate professor. Chodavarapu has begun to establish the new Integrated Microsystems Lab (IML) in our department. We are looking forward to his contributions. Also, we welcomed Ms. Julia Motz as the manager of our ECE laboratories this semester. Motz is one of our own alumni, who graduated from our department in 1993. After several years of industry experience, she is coming home to manage our undergraduate labs. This semester we also initiated two new faculty searches, one for the open computer engineering faculty position and the other for the GE EPISCenter professor. We welcomed 64 first-year students in the fall semester. Both our undergraduate and graduate student numbers continue to grow with record numbers of applications processed. During the summer, our Center of Excellence for Thin-Film Research and Surface Engineering (CETRASE) hosted the inaugural International Workshop on Thin-films for Electronics, Electro-Optics, Energy and Sensors (TFE3S), in collaboration with SPIE (the international society for optics and photonics), at the University of Dayton China Institute in Suzhou, China. The workshop was highly successful as we had over 50 invited speakers and 83 attendees participating from around the world. Our Mumma Radar Lab and Vision Lab also have gained worldwide recognition over the past year. Please enjoy the articles on our department's new activities in this newsletter. These are exciting times to be part of UD's ECE department.

UD Society for Asian Scientists and Engineers (SASE) Chapter Awarded Runner-Up for Outstanding New Chapter

The UD chapter of the Society for Asian Scientists and Engineers (SASE) was recognized as runner-up for the Inspire Award for Outstanding New Chapter in the fall. They competed against 65 other chapters across the nation. In addition to the award, the chapter's accomplishments were highlighted on various social media, and members were invited to share their experience with others at the national conference. The chapter is advised by Ms. Nancy Chase, the director of cooperative education.

ECE Students Aren't Just Engineers! *Excerpt from the* Dayton Daily News *article by Don Thrasher*

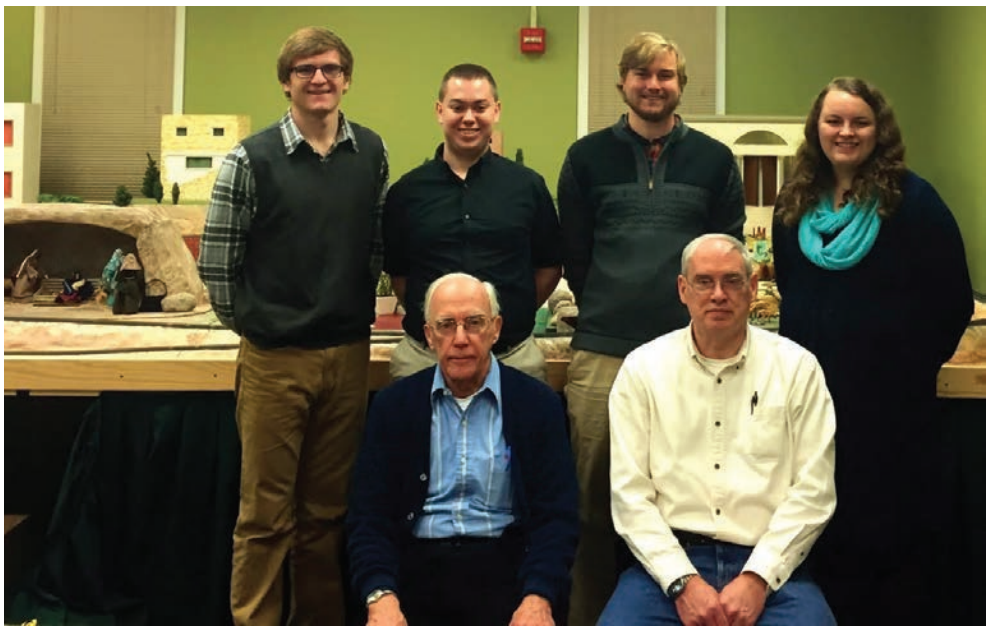
"As an acoustic blues artist, Chris Yakopcic performs solo, singing and accompanying himself with nimble finger-picking, slide guitar. His proficiency at this style of music is taking Yakopcic back to Memphis in January for the annual International Blues Challenge, where he is competing for the fourth time in the solo/duo category. ... The University of Dayton graduate will also be preparing for his return to Memphis, where 'The Next Place I Leave' has been nominated for best self-produced CD of the year by the Northeast Ohio Blues Association."

Roesch Library's Nativity Express Christmas Display

For the Christmas season, a new display was built showing 11 scenes in the life of Jesus. A model train was used to direct the audience's attention to each scene in sequence. A team of four electrical and computer engineering students was formed in the Innovation Clinic (ECE 431L) to build a controller for the model train. The requirement was to stop the train at each scene, illuminate the scene, play an audio file and then restart the train.

To accomplish this task the team built a closed loop controller that monitors the position of the train and compares it with a table containing the desired sequence. When the train approaches its next stop, an overhead light is illuminated and an audio file is played. At the end of the audio file the train accelerates to move to the next stop. The controller operates independent of any operator and is initiated through a single push button by a member of the audience. The display is located on the top floor of Roesch Library, where it will remain for several months.

Sponsors for this project were retired UD professor Dr. Harold Mushenheim and Mr. Phillip Powers. The student team responsible for the controller's hardware and software included Jeffrey Cripe, Tyler Hart, Jack Overly and Dana Walsh. Instructors included Dr. Ralph Barrera from the Department of Electrical and Computer Engineering and Dr. David Perkins from the Department of Mechanical and Aerospace Engineering.



L-R back row: Jeffrey Cripe, Tyler Hart, Jack Overly and Dana Walsh
Front row: Dr. Harold Mushenheim, Phillip Powers

Dr. Ralph Barrera

Faculty and Alumni in the Spotlight

Dr. Joe Haus

Our very own Joe Haus, professor in the electro-optics graduate program, was featured in the latest *Campus Report*. Haus was named one of the four top teachers. He is noted for training a generation of graduate students and continues to show great passion for research collaboration.

Compiled from the Dec. 4 Campus Report, *Shannon Shelton Miller, editor*

Sean Young '12

Sean Young '12 was featured in the *University of Dayton Magazine* autumn 2015 issue. He was one of six recipients of the 2015 Alumni Awards, receiving the Joe Belle Memorial Award. Young began working in the Air Force even before graduating with his master's in 2012, doing in-house programming, bench-level work and technology design. He said he enjoyed working on research he knew would benefit military operators, making their jobs easier and keeping their lives safe. He led the development, testing and deployment of a system of sensors placed on unmanned aerial vehicles to detect improvised explosive devises (IEDs) and save lives.

Excerpts taken from University of Dayton Magazine *article by Sarah Spech '16*

Dr. Keigo Hirakawa Featured on WYSO's Website

Over winter break Dr. Keigo Hirakawa was interviewed on local public radio station WYSO. Dr. Hirakawa isn't just an ECE professor — he also enjoys his jazz piano skills and plays gigs all over Dayton, Cincinnati and even Columbus. Hirakawa has been in Dayton since 2010 and says the two reasons that he came to Dayton were his new job and the music. Somehow he manages to make both of his passions work!

For the full article, see: **wyso.org/post/research-and-jazz-keep-dayton-pianist-perpetual-motion#stream/0**

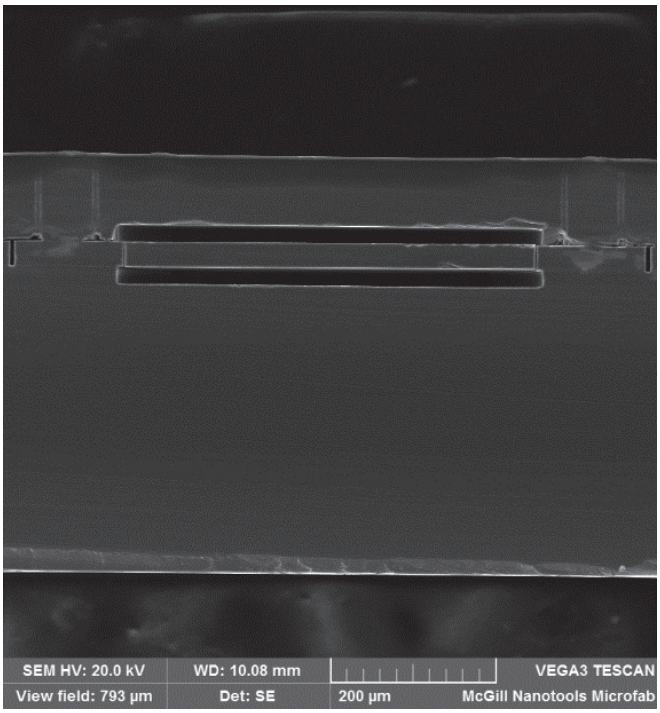
Dr. Jitendra Kumar's Article Published in *Journal of Power Sources*

For over 20 years, the Electrochemical Energy Systems Laboratory (EESL) in Kettering Labs and UD's River Campus have been engaged in development of solid/hybrid electrolytes that can provide safer Li-ion batteries by stopping electrical shorting and thermal runaway and improving cycle life of energy-dense electrodes. In our battery research, we are currently exploring commercial-grade cell components' fabrication techniques, hybridizing battery and capacitor materials to achieve high power and high energy in a single device, exploring electrical interface methodologies to integrate energy generators (grid, solar, piezoelectric, thermoelectric, human energy, etc.) and evaluate their electrical performances over a wide temperature operation range. EESL is also working to develop futuristic wireless battery management systems, wireless charging systems and battery thermal management systems to make battery systems more efficient and long-lasting. The EESL is currently funded by the U.S. Army's Small Business Tech Transfer (STTR) Phase II program for flexible batteries. EESL has been selected for two projects in the Ohio Federal Jobs Network's Center of Excellence for Energy Storage and Integration. Moreover, EESL produces industry-ready ECE and MEE students who gain hands-on experiences on aforementioned battery power research.

ECE Faculty Advances ROTC With Engineering

Dr. Tarek Taha and Dr. Chris Yakopcic, along with Dr. Charles Browning from the Department of Chemical and Materials Engineering, are running a new research and training program on cyber defense hardware and software. The program would train a set of ROTC cadets to develop novel cyber security software on cutting-edge neural hardware. This hardware processes information in a brainlike manner and is thus significantly more efficient than traditional computers. Several studies by Taha's group have shown that this type of hardware can be over a thousand times more efficient, thus allowing a handheld device to process information that would otherwise require very large computing systems to be used. At present, a group of eight cadets is being trained through the program.

Dr. Vamsy Chodavarapu and Wafer-Level Vacuum Packaging of MEMS Devices



Dr. Vamsy Chodavarapu and his team collaborated with Canadian Microelectronics Corporation (CMC) and Teledyne DALSA Inc. in Bromont, Quebec, Canada, to help evaluate the world's most ultraclean wafer-level vacuum packaging of MEMS devices. This new microfabrication process, called MEMS Integrated Design for Inertial Sensors (MIDIS), offers total leak rate equivalent as low as 6.5 × 10−17 atm cm3/s. Using this process, Chodavarapu and his team have developed low-noise and high-sensitivity triaxial accelerometers, high Quality factor (Q) resonant gyroscopes, high accuracy absolute pressure sensors and ultrahigh Q resonators for timing applications.

The developed silicon MEMS resonators for timing and frequency references demonstrated extremely high Q of 3.24 million at a resonance frequency of 6.89 MHz. The figure left shows the scanning electron micrograph of the cross-section of the MEMS resonators in MIDIS process.

Welcome to ECE to Ms. Julia Rammel Motz, our new ECE lab manager. Motz is a 1993 UD electrical engineering alumna and was in the Gamma class of Phi Sigma Rho. We are thrilled to welcome her back to UD.

Theus Aspiras Awarded Best Student Paper at IEEE Applied Imagery Pattern Recognition 2015

"Learning a synthetic vehicle database using the Gaussian nonlinear line attractor network"

GRADUATES – DEC. 2015

B.S./B.E. Degrees Awarded

Austin M. Alber

Jahaz T. Alotaibi

Abdullah S. Alshammari

Evan J. Brohman

Daniel N. Buerkle

Charles R. Forenza

Yidong Miao

Jianyu Pan

Nicholas M. Pelini

Alexander P. Remillard

Vikranth Sivakumar

Shuo Sun

Genavieve J. Wendel

Stefan A. Westberg

Nicholas W. Wright

Garrett W. Wyatt

Ahmad Yousef

M.S. Degrees Awarded

Nahar M. Alanazi

Abdullah M. Aldawsari

Mohammed M. Almatrafi

Talal M. Alqahtani

Ahmed S. Alsafran

Osama A. Alsattam

Saleh Mohammed S. AlShahry

Nawaf A. Alshammari

Michael T. Barnard

Venkata S. R. P. Bolla

Venkataramesh Bontupalli

Stephen E. Bricker

Ranga Burada

Ramakrishna Challa

Hua Chen

Jacob M. Copley

Rakesh Devarasetty

Mounika Dugyala

Bhanu Prasad Ganguru

Naresh Gollapudi

Bhavana Gujjarlapudi

Shan Guo

Junyi He

Teja Juloori

Hariprasad Kandhiraju

Raviteja Kanneboina

Praveed Kasineni

Shiva Kumar Kodamanchili

Shashidhar Reddy Komatireddy

Pavani Koneru

Evan W. Krieger

Kevin C. Krucki

Khalifa E. Lala

Harsha Maduri

Karthik Varma V. Mantena

Sri Harsha Modukuri

Christopher J. Morman

Ananth Raja Muthukalyani

Ankith Nayakoti

Sadha S. S. Pasham

Yangjie Qi

Jason E. Quillen

Bhargav Sangars

Snehalatha Reddy Sanjannagari

Aditya Sankaramanchi

Umeshchandra Solthi

Purna Chand Talasila

Yang Tao

Srikanth Thodupunoori

Krishna C. Vangala

Nina M. Varney

Varun Vidala

Changsheng Xiang

Jing Zuo

Ph.D. Degrees Awarded

Hariharan S. Ananthanarayanan

Wu Cheng

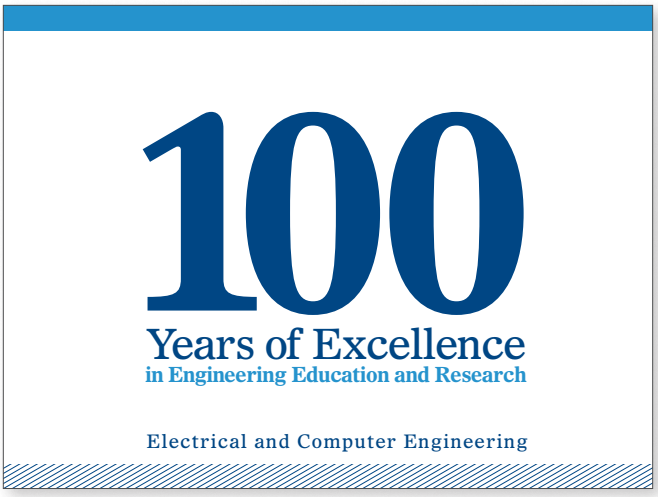
Sai Babu Arigela

Yi Zhang

Theus H. Aspiras

Announcing the ECE Centennial Book

It is with great pleasure that we announce the completion of the book *100 Years of Excellence in Engineering Education and Research: Electrical and Computer Engineering*. The book highlights the humble beginnings of the electrical engineering department at UD in 1911. It chronicles the growth of the department and the people that were instrumental in making this program what it is today. The book is available to all our alumni, parents, students and friends for $25 each. To place an order for your copy please fill out the order form below.



100 Years of Excellence in Engineering Education and Research: Electrical and Computer Engineering Order Form

Name_____ Date _____

Address _____

City _____ State_____ ZIP _____

Phone number _____

Email address _____

Quantity of books_____

Total price _____

Return this form and a check for the total amount made out to:
UD Electrical & Computer Engineering Department

Send to: **Nancy Striebich, Department of Electrical and Computer Engineering**
300 College Park
Dayton, OH 45469-0232

Orders can also be submitted via email at:
nstriebich1@udayton.edu